

CLAIMS:

1. Apparatus for producing a yarn including a reciprocating twisting stage adapted to simultaneously twist one or more slivers to produce one or more twisted strands, including one or more rollers arranged to move reciprocally along the axis of rotation of the roller(s) to impart twist to the sliver(s), and a control system which enables controlled variation of the rotational speed of the one or more rollers during operation of the apparatus, to impart a varying degree of twist to the sliver(s) or strand(s) along the length thereof as the sliver(s) or strand(s) pass through the apparatus.
2. Apparatus for producing a yarn including a reciprocating twisting stage adapted to simultaneously twist one or more slivers to produce one or more twisted strands, including one or more rollers arranged to move reciprocally along the axis of rotation of the roller(s) to impart twist to the sliver(s), and so mounted that the extent of the transverse reciprocal movement of the roller(s) can be controlled and varied to vary the twist imparted to the sliver(s) or strands.
3. Apparatus for producing a yarn including a reciprocating twisting stage adapted to simultaneously twist one or more slivers to produce one or more twisted strands, including one or more rollers arranged to move reciprocally along the axis of rotation of the roller(s) to impart twist to the sliver(s), and a control system which enables controlled variation of the rotational speed of the one or more rollers during operation of the apparatus as the sliver(s) or strand(s) pass through the apparatus, and of the speed of reciprocal movement along the axis of rotation of the roller(s), to impart a varying degree of twist along the length of the sliver(s) or strand(s).
4. Apparatus for producing a yarn including a reciprocating twisting stage adapted to simultaneously twist one or more slivers to produce one or more twisted strands, including one or more rollers arranged to move reciprocally along the axis of rotation of the roller(s) to impart twist to the sliver(s) and so mounted that the extent of the transverse reciprocal movement of the roller(s) can be varied and a control system

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which enables control and variation of the rotational speed of one or more rollers and of the extent of transverse reciprocal movement of the roller(s), to vary the twist imparted to the sliver(s) or strands.

- 5 5. Apparatus for producing a yarn including a reciprocating twisting stage adapted to simultaneously twist one more slivers to produce one or more twisted strands, including one or more rollers arranged to move reciprocally along the axis of rotation of the roller(s) to impart twist to the sliver(s), and control means enabling control and variation of the speed of the reciprocal movement along the axis of rotation of the roller(s) and of
10 the extent of transverse reciprocal movement of the roller(s), to vary the twist imparted to the sliver(s) or strands.
- 15 6. Apparatus for producing a yarn including a reciprocating twisting stage adapted to simultaneously twist one or more slivers to produce one or more twisted strands, including one or more rollers arranged to move reciprocally along the axis of rotation of the roller(s) to impart twist to the sliver(s), and a control system which enables control and variation of the rotational speed of the one or more rollers, and the speed of reciprocal movement and the extent of the transverse reciprocal movement of the roller(s) to vary the twist imparted to the slivers or strands.
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- 25 7. Apparatus according to any one of claims 1 to 6 wherein the control system enables a user to programme the twist profile to be imparted to a production run, series of production runs, or part run of yarn.
- 30 8. Apparatus according to claim 6 wherein the control system is microprocessor based and includes a user operable keyboard and display.
9. Apparatus according to any one of claims 1 to 8 also including one or more guides positioned after the twist roller(s) such that one or more of the strands passes over a longer path than one or more other strands before the strands are brought together to form a multi-ply yarn, one or more of which guide(s) are movable enabling varying of the position of one or more guide(s) between production runs.

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10. Apparatus according to claim 9 including an electro-mechanical guide reposition system for moving one or more of said guide(s), which is also programmably controllable by the control system of the apparatus.

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11. Apparatus according to any one of claims 1 to 10 also including a second said reciprocating twisting stage through which the slivers also pass to further twist the slivers.

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12. Apparatus according to claim 11 wherein said second reciprocating twist stage is arranged to impart twist to the sliver(s) in areas of non-twist between areas of twist imparted to the sliver(s) by the first reciprocating twist stage.

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13. Apparatus according to any one of claims 1 to 12 also including at least one roller before the reciprocating twisting stage, and at least one guide arranged to introduce a core filament into at least one of the slivers so that the filament passes against the roller with the sliver and is pressed into the sliver by the roller before the sliver passes through the reciprocating twist stage(s).

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14. Apparatus according to any one of claims 1 to 13 including a pair of drafting rollers or belts before the reciprocating twisting stage.